CLAIMS

1. A controlled structure copolymer comprising at least two parts A and B of different compositions, part A comprising ionic or potentially ionic units, characterized in that:

- part A is an amphoteric or zwitterionic part, comprising:
  - cationic or potentially cationic units A_C,
  - anionic or potentially anionic units A_A, and
  - optionally, hydrophilic and/or hydrophobic neutral units A_N,

  and/or
  - zwitterionic units A_Z,
  - optionally, cationic or potentially cationic units A_C,
  - optionally, anionic or potentially anionic units A_A, and
  - optionally, hydrophilic and/or hydrophobic neutral units A_N,
- part B is not an amphoteric or zwitterionic part.

2. The copolymer as claimed in the preceding claim, characterized in that part B is a hydrophilic or hydrophobic neutral part comprising hydrophilic or hydrophobic neutral units.

3. The copolymer as claimed in claim 1 or 2, characterized in that it has one of the following structures:

- block copolymer, comprising at least two blocks, part A corresponding to one block, part B corresponding to another, part A optionally having a composition gradient,
- comb or grafted copolymer, comprising a backbone and side chains, with part A corresponding to the backbone and part B corresponding to side chains, or with part B corresponding to the backbone and part A corresponding to side chains,

- star or microgel copolymer, comprising a polymeric or nonpolymeric core, and peripheral polymeric chains, one part corresponding to the core, the other corresponding to the peripheral chains.

4. The copolymer as claimed in one of the preceding claims, characterized in that it is a (block A)-(block B) diblock copolymer, a (block A)-(block B)-(block A) triblock copolymer or a (block B)-(block A)-(block B) triblock copolymer.

5. The copolymer as claimed in one of the preceding claims, characterized in that it is obtained by means of a controlled radical polymerization process.

6. The copolymer as claimed in one of the preceding claims, characterized in that part B is a neutral part, and in that part A has a positive, negative or neutral average charge Q.

7. The copolymer as claimed in one of the preceding claims, characterized in that it is in the form of a powder, in the form of a dispersion in a liquid, or in the form of a solution in a solvent.

8. The copolymer as claimed in one of the preceding claims, characterized in that the units A_c derived from the monomers are selected from:

- N,N-(dialkylamino-ω-alkyl)amides of α,β-monoethylenically unsaturated carboxylic acids, such as N,N-dimethylaminomethylacrylamide or -methacrylamide, 2-(N,N-dimethylamino)ethylacrylamide or -methacrylamide, 3-(N,N-dimethylamino)propylacrylamide or -methacrylamide, and 4-(N,N-dimethylamino)butylacrylamide or -methacrylamide,
- α,β-monoethylenically unsaturated amino esters such as 2-(dimethylamino)ethyl acrylate (DMAA), 2-(dimethylamino)ethyl methacrylate (DMAM), 3-(dimethylamino)propyl methacrylate, 2-(tert-butyl-

amino)ethyl methacrylate, 2-(dipentylamino)ethyl methacrylate, and 2(diethylamino)ethyl methacrylate,

- vinylpyridines,
- vinylamine,
- vinylimidazolines,
- monomers that are precursors of amine functions such as N-vinylformamide, N-vinylacetamide, which give rise to primary amine functions by simple acid or base hydrolysis,
- acryloyl- or acryloyloxyammonium monomers such as trimethylammonium propyl methacrylate chloride, trimethylammonium ethylacrylamide or -methacrylamide chloride or bromide, trimethylammonium butylacrylamide or -methacrylamide methyl sulfate, trimethylammonium propylmethacrylamide methyl sulfate (MES), (3-methacrylamidopropyl)trimethylammonium chloride (MAPTAC), (3-acrylamidopropyl)trimethylammonium chloride (APTAC), methacryloyloxyethyltrimethylammonium chloride or methyl sulfate, and acryloyloxyethyltrimethylammonium chloride;
- 1-ethyl-2-vinylpyridinium or 1-ethyl-4-vinylpyridinium bromide, chloride or methyl sulfate;
- N,N-dialkyldiallylamine monomers such as N,N-dimethyldiallylammonium chloride (DADMAC);
- polyquaternary monomers such as dimethylaminopropylmethacrylamide chloride and N-(3-chloro-2-hydroxypropyl)trimethylammonium (DIQUAT).

9. The copolymer as claimed in one of the preceding claims, characterized in that the units A_A derived from the monomers are selected from:

- monomers having at least one carboxylic function, for instance α,β-ethylenically unsaturated carboxylic acids or the corresponding anhydrides, such as acrylic, methacrylic or maleic acids or anhydrides, fumaric acid, itaconic acid, N-methacroylalanine, N-acryloylglycine, and their water-soluble salts,
- monomers that are precursors of carboxylate functions, such as tert-butyl acrylate, which, after

polymerization, give rise to carboxylic functions by hydrolysis,

- monomers having at least one sulfate or sulfonate function, such as 2-sulfooxyethyl methacrylate, vinylbenzene sulfonic acid, allyl sulfonic acid, 2-acrylamido-2-methylpropane sulfonic acid, sulfoethyl acrylate or methacrylate, sulfopropyl acrylate or methacrylate, and their water-soluble salts,
- monomers having at least one phosphonate or phosphate function, such as vinylphosphonic acid, the esters of ethylenically unsaturated phosphates, such as the phosphates derived from hydroxyethyl methacrylate and those derived from polyoxyalkylene methacrylates, and their water-soluble salts.

10. The copolymer as claimed in one of the preceding claims, characterized in that the units A_N derived from the monomers are selected from:

- vinylaromatic monomers such as styrene, alpha-methylstyrene, vinyltoluene,
- vinyl halides or vinylidene halides, such as vinyl chloride, vinylidene chloride,
- C_1-C_{12} alkylesters of α,β-monoethylenically unsaturated acids such as methyl, ethyl or butyl acrylates and methacrylates, 2-ethylhexyl acrylate,
- vinyl esters or allyl esters of saturated carboxylic acids, such as vinyl or allyl acetates, propionates, versatates, stearates,
- α,β-monoethylenically unsaturated nitriles containing from 3 to 12 carbon atoms, such as acrylonitrile, methacrylonitrile,
- α-olefins such as ethylene,
- conjugated dienes, such as butadiene, isoprene, chloroprene,
- monomers capable of generating polydimethylsiloxane (PDMS) chains,
- hydroxyalkyl esters of α,β-ethylenically unsaturated acids, such as hydroxyethyl or hydroxypropyl

acrylates and methacrylates, glyceryl monomethacrylate,

- α,β-ethylenically unsaturated amides such as acrylamide, N,N-dimethylmethacrylamide, N-methylol-acrylamide,
- α,β-ethylenically unsaturated monomers bearing a water-soluble polyoxyalkylene segment of the polyethylene oxide type, such as polyethylene oxide α-methacrylates or α,ω-dimethacrylates, ω-behenyl polyoxyethylene methacrylate, and ω-tristyrylphenyl polyoxyethylene methacrylate,
- α,β-ethylenically unsaturated monomers which are precursors of hydrophilic units or segments, such as vinyl acetate, which, once polymerized, can be hydrolyzed in order to give rise to vinyl alcohol units or polyvinyl alcohol segments,
- vinylpyrrolidones,
- α,β-ethylenically unsaturated monomers of the ureido type, and in particular 2-imidazolidinone-ethyl methacrylamide.

11. The copolymer as claimed in one of the preceding claims, characterized in that the units A_z derived from the monomers are selected from:

- sulfobetaine monomers, such as sulfopropyl dimethylammonium ethyl methacrylate, sulfopropyl-dimethylammonium propylmethacrylamide, and sulfopropyl-2-vinylpyridinium,
- phosphobetaine monomers, such as phosphatoethyl trimethylammonium ethyl methacrylate,
- carboxybetaine monomers.

12. The copolymer as claimed in one of the preceding claims, characterized in that part B comprises units derived from hydrophobic neutral monomers selected from:

- vinylaromatic monomers such as styrene, alpha-methylstyrene, vinyltoluene,

- vinyl halides or vinylidene halides, such as vinyl chloride, vinylidene chloride,
- C_1-C_{12} alkylesters of α,β-monoethylenically unsaturated acids such as methyl, ethyl or butyl acrylates and methacrylates, 2-ethylhexyl acrylate,
- vinyl esters or allyl esters of saturated carboxylic acids, such as vinyl or allyl acetates, propionates, versatates, stearates,
- α,β-monoethylenically unsaturated nitriles containing from 3 to 12 carbon atoms, such as acrylonitrile, methacrylonitrile,
- α-olefins such as ethylene,
- conjugated dienes, such as butadiene, isoprene, chloroprene,
- monomers capable of generating polydimethylsiloxane chains.

13. The copolymer as claimed in one of claims 3 to 12, characterized in that it has a following block copolymer structure, comprising at least two blocks, part A corresponding to one block, part B corresponding to another, part A having a homopolymer, if it comprises units A_z, random copolymer or composition gradient copolymer structure.

14. The use of a copolymer as claimed in one of the preceding claims, in detergent compositions, fabric care compositions, or compositions for cleansing, treating and/or protecting the skin and/or the hair.